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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,545	05/12/2004	Garrin Samii	AMS-004	3544

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EXAMINER	
DOVE, TRACY MAE	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 04/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/709,545	SAMII ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-36* is/are pending in the application.

4a) Of the above claim(s) *10-22,24,25,33,34 and 36* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23,26-32 and 35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the communication filed on 3/22/05. Applicant's arguments have been considered, but are not persuasive. Claims 1-9 have been canceled. Claims 10-36 are pending with claims 10-22, 24, 25, 33, 34 and 36 being withdrawn as being drawn to a non-elected invention. The Action is made **FINAL**, as necessitated by amendment.

Election/Restrictions

Applicant states in the remarks filed on 3/22/05 that an election with traverse was intended. However, the Applicant elected without traverse on 11/4/04, as stated in the Office Action mailed 11/9/04. Furthermore, because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Newly submitted claims 24, 25, 33 and 34 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: the claims are directed to a non-elected species. In response to the restriction/election of species requirement contained in the Action mailed 11/9/04, Applicant elected a microporous membrane comprising ultra high molecular weight polyolefin and TiO_2.

Newly submitted claim 36 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: a filter comprising a separator is independent and distinct from the elected invention because it would require a separate search, not required by the elected invention. Specifically, filters and batteries are not classified together and are clearly distinct inventions. Claim 36 would belong in non-elected Group III of the restriction requirement contained in the Action mailed 11/9/04.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 24, 25, 33, 34 and 36 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

All communications filed in response to this Action must list at least claims 10-22, 24, 25, 33, 34 and 36 as withdrawn. Otherwise, the amendment will be held non-compliant.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 23, 26-32 and 35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 23, as amended, recites "said microporous membrane comprised of between 70% and 95% a ultra high molecular weight polyolefin having a minimum average molecular weight of $1x10^6$, and between 5% and 30% a TiO_2 particulate filler with an average particle size diameter of between 0.001 μm and 1 μm", which is not supported by the specification as filed. Specifically, the percentage range of the polyolefin and the percentage range of TiO_2 are not supported by the original specification.

Claim 27 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described

in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim recites "a shutdown temperature of 130°C plus or minus 20°C", which is not supported by the original specification.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 23, 26-32 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 recites "said microporous membrane comprised of between 70% and 95% a ultra high molecular weight polyolefin having a minimum average molecular weight of $1x10^6$, and between 5% and 30% a TiO_2 particulate filler with an average particle size diameter of between 0.001 μm and 1 μm", which is indefinite because the basis of the percentage range is not specified (it is unclear what the percentages are based upon). It is unclear how the percent range for the polyolefin and the percent range for the filler are related.

Claims Analysis

The phrase "used in a battery containing a non-aqueous (organic) electrolyte solution" in claim 30 is not given patentable weight because the phrase does not further limit the battery separator of claim 23 (intended use limitation).

Claim Objections

Claims 26-31 and 35 are objected to because of the following informalities: the claims are multiple dependent claims that may depend from a withdrawn claim (claims 24 and 25) or an

elected claim (claim 23). Claims 26-31 and 35 should be amended to depend only from elected claim 23. Appropriate correction is required.

Claim 30 is objected to because of the following informalities: the claims recites "(organic)", which is improper. Examiner suggests the parenthesis be deleted so the claim clearly recites "organic". Appropriate correction is required.

*To the extent the claims are understood in view of the 35 U.S.C. 112, 1st and 2nd, rejections above, note the following prior art rejections.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 23, 26, 27, 30, 32 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Sogo, US 5,641,565.

Sogo teaches a separator for a battery comprising a microporous film including a matrix comprised of a polyethylene and a polypropylene polymer. The polyethylene has a molecular weight of not smaller than 1,000,000 and is in a proportion of 10% by weight. The separator has

a thickness of 10-500 μm, a porosity of 40-85% and a maximum pore diameter of 0.05-5 μm (abstract). The membrane is produced by blending the matrix polymer with inorganic particles, such as titanium oxide, having an average particle size of from 0.005-0.5μm (21-25). The separator comprises 10-60 wt% of the matrix polymer and 10-50 wt% of the inorganic particles (6:63-7:10). The membrane may contain 3% by weight or less of the inorganic particles based on the weight of the microporous film (8:36-39). The separator has a shutdown temperature of 135-140°C and a melt integrity of 165°C (9:4-11). The air permeability of the membrane is shown in Table 1.

Thus the claims are anticipated.

**

Claims 23, 26-32 and 35 are rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Samii et al., US 6,372,379.

Samii teaches a microporous membrane battery separator for a battery comprising a filler and a polyolefin. The polyolefin has a molecular weight of at least 3,000,000 and the filler comprise titanium dioxide (TiO_2). The battery separator has an average pore diameter in a range of 0.01-0.1 microns and a thickness between 3-10 mils (5:40-62). Note 3-10 mils is equivalent to 76.2-254 μm (see conversion printout, obtained from ProKon Unit Conversion, attached to this Action). The titanium dioxide filler has a particle diameter of 0.017 microns (6:5-9). Example 1 teaches the membrane may have a porosity of 50% and consists of approximately 5% UHMW polyethylene and 95% TiO_2. The membrane of example 1 has an average pore diameter of 0.077 microns. A wetting agent is used to coat the membrane (6:14-15). Example 2 teaches a blend of 5 parts of ultra fine titanium dioxide (particulate filler of presently claimed invention)

and 95 parts of pigment grade titanium dioxide was prepared. The resulting microporous membrane consists approximately of 5% polymer and 95% filler. Only 5% of the filler is the ultra fine titanium dioxide (5:95 ratio), therefore, the membrane contains approximately 4.75% of ultra fine titanium dioxide. Approximately 4.75% encompasses the claimed endpoint of 5%.

Thus the claims are anticipated.

Samii is silent regarding the air permeability of the membrane. However, the membrane of Samii would inherently have an air permeability in the range recited by the claimed invention. Air permeability is the time required for a measured amount of air to pass through the separator (present specification, [0056]). Since the separator of the claimed invention and the separator of Samii appear to be the same, the separator of the claimed invention and the separator of Samii would have the same air permeability property. Samii teaches the membrane of example 1 has an average pore diameter of 0.077 microns, which falls within the average pore diameter range of claim 32. The air passes through the pores of the separator, thus, separators with the same average pore diameter would inherently have the same permeability to air.

Regarding claims 26-28, Samii is silent regarding a shutdown temperature, a melt integrity or a puncture resistance of the membrane separator. However, since the separator of the claimed invention and the separator of Samii appear to be the same, the separator of the claimed invention and the separator of Samii would inherently have the same properties. One of skill would have known that identical materials melt at the same temperature, shutdown at the same temperature and have the same puncture resistance.

Regarding claim 29, the limitation a "thermal shrinkage of 10% or less both in the machine and transverse directions" is considered a product-by-process limitations. The courts

have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. MPEP 2113. Samii teaches that if the membrane is immersed in boiling water, the membrane shrinks 10-20% in the machine direction (Examples 3 & 4). Samii also teaches if the membrane is dried with hot air the membrane does not shrink at all (Example 5).

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Claims 28, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sogo, US 5,641,565 in view of admitted prior art at paragraph [0086] of the present specification.

Sogo teaches a separator for a battery comprising a microporous film including a matrix comprised of a polyethylene and a polypropylene polymer. The polyethylene has a molecular weight of not smaller than 1,000,000 and is in a proportion of 10% by weight. The separator has a thickness of 10-500 μm, a porosity of 40-85% and a maximum pore diameter of 0.05-5 μm (abstract). The membrane is produced by blending the matrix polymer with inorganic particles, such as titanium oxide, having an average particle size of from 0.005-0.5μm (21-25). The separator comprises 10-60 wt% of the matrix polymer and 10-50 wt% of the inorganic particles (6:63-7:10). The membrane may contain 3% by weight or less of the inorganic particles based on the weight of the microporous film (8:36-39). The separator has a shutdown temperature of 135-140°C and a melt integrity of 165°C (9:4-11). The air permeability of the membrane is shown in Table 1.

Sogo is silent regarding the puncture resistance of the membrane separator.

However, since the separator of the claimed invention and the separator of Sogo appear to be the same, the separator of the claimed invention and the separator of Sogo would inherently

have the same properties. One of skill would have known that identical materials have the same puncture resistance.

Sogo is silent regarding the thermal shrinkage of the membrane separator.

However, the limitation a "thermal shrinkage of 10% or less both in the machine and transverse directions" is considered a product-by-process limitations. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious. MPEP 2113.

Sogo is silent regarding a surface treatment of the membrane separator.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Applicant admits that the most common method of surface treatment is by using a suitable wetting agent to coat the microporous sheet separator. The specification states "The method of coating and type of wetting agents are well known in prior art and there is no need to discuss these in detail". One of skill in the art would have been motivated to treat the separator surface with a wetting agent because this is the most common surface treatment, as admitted by Applicant.

Response to Arguments

Applicant's arguments filed 3/22/05 have been fully considered but they are not persuasive.

Examiner points out that all elected claims (23, 26-32 and 35) have been rejected under 35 U.S.C. 112, 1st, for containing new matter. If the new matter is deleted from the claims, the prior art rejections will still be maintained.

Applicant argues Sogo does not teach the claimed percentage of titanium dioxide of between 5%-30%. However, this limitation has been rejected under 35 U.S.C. 112, 2nd, as being

indefinite. The claim does not recite the basis of the percentage range, thus, the Examiner cannot determine what "between 5% and 30% a TiO_2 particulate filler" encompasses. Furthermore, this limitation has been rejected as new matter.

Applicant argues Samii '379 does not teach the claimed percentage of titanium dioxide of between 5%-30%. However, this limitation has been rejected under 35 U.S.C. 112, 2nd, as being indefinite. The claim does not recite the basis of the percentage range, thus, the Examiner cannot determine what "between 5% and 30% a TiO_2 particulate filler" encompasses. Furthermore, Example 2 of Samii '379 teaches a blend of 5 parts of ultra fine titanium dioxide (particulate filler of presently claimed invention) and 95 parts of pigment grade titanium dioxide was prepared. The resulting microporous membrane consists approximately of 5% polymer and 95% filler. Only 5% of the filler is the ultra fine titanium dioxide (5:95 ratio), therefore, the membrane contains approximately 4.75% of ultra fine titanium dioxide. Approximately 4.75% encompasses the claimed endpoint of 5%. Note this limitation has been rejected as new matter.

Applicant's arguments regarding Nagou are moot because Nagou has not been applied as prior art against the presently claimed invention.

Applicant states the presently claimed separator is constructed to serve a different function from the prior art, that of facilitating shutdown of the separator when the temperature rises to a dangerous level. Applicant states the prior art cited teaches the TiO_2 facilitates the formation of pores in the membrane. It is unclear how this argument distinguishes the claimed invention over the prior art of record. Specifically, Sogo teaches a separator with a shutdown temperature of 135-140°C and a melt integrity of 165°C (9:4-11), as presently recited by the

claimed invention. Furthermore, the present specification recites the filler increases the porosity of the separator (0027).

Applicant states a percentage of TiO2 in the range of 5-30% is supported by Example 1 that teaches 12wt% of TiO2. Claimed ranges must be entirely supported by the specification as filed. Applicant states the ranges of claim 23 cause the "unexpected result of providing high melt integrity and shutdown capability". However, Sogo teaches a separator with a shutdown temperature of 135-140°C (9:4-11), thus, the ranges of claim 23 do not provide "unexpected results" regarding melt integrity and shutdown capability.

Applicant argues "in the current application...a controlled amount of TiO_2 filler is left". Examiner requests that Applicant point of the section of the original specification that discusses removal of any of the TiO_2 filler added to the membrane. The amount of filler claimed in instant claim 23 is present in the product separator. Applicant then provides data the 10% of TiO_2 results in a melt integrity temperature of 140°C. Since Sogo teaches a separator with a shutdown temperature of 135-140°C and a melt integrity of 165°C, how does this data overcome the rejection of record? Applicant's argument that none of the prior art relates to the shutdown temperature/ melt integrity function is simply incorrect.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

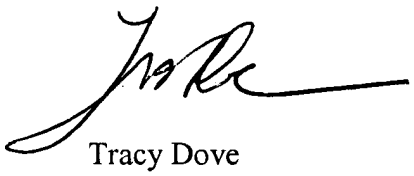
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tracy Dove
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Art Unit 1745
March 29, 2005